

## (12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)



(19) World Intellectual Property Organization  
International Bureau

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(10) International Publication Number  
**WO 01/74063 A1**

(11) International Publication Date  
4 October 2001 (04.10.2001) **PCT**

(43) International Patent Classification:  
**H04N 5/445** (74) Agent: CHO, Steve, Y. et al.; Townsend and Townsend and Clegg Ltd., Two Barbadoes Center, 8th Floor, San Francisco, CA 94111 (US).

(21) International Application Number: PCT/US01/09568

(22) International Filing Date: 22 March 2001 (22.03.2001)

(81) Designated States (regional): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, IR, IU, ID, IL, IN, IS, JP, KH, KG, KP, KR, KW, KZ, LK, LR, LS, LT, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, TL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YL, ZA, ZW.

(30) Priority Data:  
20 March 2000 (20.03.2000) US  
10/193,046  
10/151,147  
10/152,198  
24 June 2000 (24.06.2000) US  
10/150,040  
24 June 2000 (24.06.2000) US  
10/150,040

(84) Designated States (regional): ARPO patent (GL, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJK, TM), European patent (AT, BH, CL, CY, DE, DK, IS, NL, PR, GR, HR, IE, IT, LI, MC, NL, PT, SE, TR), OAPI patent (BP, BL, CF, CG, CI, CM, GA, GN, GW, ML, MR, SN, TD, TG).

(71) Applicant: DIGEO BROADBAND, INC. (US); 8815

122nd Avenue NE, Kirkland, WA 98033 (US).

(72) Inventor: ISTVAN, Anthony, F.; 7213 Chamielder Avenue SE, Snoqualmie, WA 98065 (US). Published: \_\_\_\_\_ with International search report

(54) Title: USER CUSTOMIZABLE INTERFACE TO TV AND INTERNET CONTENT  
[Continued on next page]

Header Page	Current Page
Link #1 Hertz, in a bold move that could trigger a bidding war, merges talks with Bestfoods according to people close to Hertz.	NEW YORK - Ketchup dynasty Heinz is pressing to start
Link #2 Pittsburgh-based Heinz's effort to link arms with Bestfoods comes after Englewood, N.J.-based maker of Skippy peanut butter and Mazola cooking oil attempts to fight off an unsolicited \$18.4 billion all-cash takeover offer from the Dutch food and consumer products giant. Unilever.	Hertz's
Link #3 Heinz Chairman Anthony O'Reilly is in New York this week to convince Bestfoods CEO Dick Shoenate that a merger of equals is long overdue. According to people familiar with the matter, Hertz is prepared to offer up to \$72 a share to beat Unilever's \$68-a-share bid. In an effort to	an
Link #4 Link #5 Link #6 Link #7	Done

(57) Abstract: A single integrated user interface (300) for user-friendly access to both broadcast television (Fig. 20) and Internet content. One embodiment of the user interface comprises a "L" configuration of controls (302, 304). Primary controls (302) are provided along a first direction of the "L", and context-sensitive controls (304) are provided along a second direction of the "L". The context-sensitive controls (304) that are provided depend on the content being displayed (301). A first pair of arrows (110a, 111a) on a primary control (110a) navigate among the primary controls (302), and a second pair of arrows (110b, 111b) (perpendicularly to the first pair) navigate among the context-sensitive controls (304). Switching between navigation among the primary controls and navigation among the context-sensitive controls occurs automatically upon switching between using the first pair of arrows (110a, 111a) and using the second pair of arrows (110b, 111b). Advantageously, the user interface automatically adjusts itself by providing different context-sensitive controls depending on the type of multimedia content in the display area (301).

**WO 01/74063 A1**

BEST AVAILABLE COPY

anchors. In this simple user interface, access to Web pages is provided for separately from access to broadcast TV.

## USER CUSTOMIZABLE INTERFACE TO TV AND INTERNET CONTENT

### RELATED APPLICATIONS

The present application is related to and claims priority from provisional application U.S. Serial No. 60/193,046, entitled "User Interface for Interactive Television with Broadband Connectivity to the Internet," filed March 29, 2000, with inventor Anthony F. Istvan, which is hereby incorporated by reference in its entirety. The present application is also a continuation-in-part of nonprovisional application U.S. Serial No. 09/591,547, entitled "L Configured User Interface to Television and Internet Content," filed June 8, 2000, with inventors Anthony F. Istvan and Lisa M. Wilkins.

### FIELD OF THE INVENTION

The present application pertains to the fields of television reception and Internet access. More particularly, the present application pertains to a user interface to television broadcasts and Internet content.

### BACKGROUND

Televisions and Internet technologies are beginning to converge. In particular, access to the World Wide Web via an Internet-enabled television system is progressing and becoming more popular. However, prior art user interfaces for such systems are limited in their capabilities and do not provide for user-friendly access to both broadcast television (TV) and Internet content.

U.S. Patent No. 6,034,689, entitled "Web Browser Allowing Navigation Between Hypertext Objects Using Remote Control," discloses browser software implemented in a set-top box which allows a user to navigate using a remote control through World Wide Web pages. This browser software has limited capabilities and comprises a relatively simple user interface which allows for selection of hypertext

### SUMMARY

User interfaces for Internet-enabled television systems have unique needs stemming from their need to display, in a user-friendly way, both broadcast television and Internet content. The present invention provides for user-friendly access to both broadcast television and Internet content via a single integrated user interface.

One embodiment of the user interface comprises a "L" configuration of controls. Primary controls are provided along a first direction of the "L," and context-sensitive controls are provided along a second direction of the "L." The context-sensitive controls that are provided depend on the content being displayed. A first pair of arrows on a remote control navigates among the primary controls, and a second pair of arrows (perpendicular to the first pair) navigates among the context-sensitive controls. Switching between navigation among the primary controls and navigation among the context-sensitive controls occurs automatically upon switching between using the first pair of arrows and using the second pair of arrows.

Advantageously, the user interface automatically adjusts itself by providing different context-sensitive controls depending on the type of multimedia content in the display area. Furthermore, the user interface enables one-button switching between the primary controls and the context-sensitive controls to provide particularly user-friendly access to the content.

In addition, the interface may advantageously be user customizable to speed-up and facilitate access to content desired by the user. For example, options or selections may be customizable by the user to be integrated with the user interface. In one particular instance, selections of synthetic channels focusing on specialized content categories may be chosen by a user to be integrated with the user interface.

**BRIEF DESCRIPTION OF THE DRAWINGS**

Fig. 1 is a schematic diagram depicting a system 100 for distributing Internet content, in addition to TV content, in accordance with an embodiment of the present invention.

Fig. 2 is an illustrative screen frame of a display with a full-size video being displayed.

Fig. 3 depicts an example layout 300 of a user interface (UI) which has been activated in accordance with an embodiment of the present invention.

Fig. 4 is an illustrative screen frame of a UI which has been activated in accordance with an embodiment of the present invention.

Fig. 5 depicts an example layout 500 of a UI with a user submenu activated in accordance with an embodiment of the present invention.

Fig. 6 depicts an example layout 600 of a UI with a TV submenu 602 activated in accordance with an embodiment of the present invention.

Fig. 7 depicts an example layout 700 of a UI with television listing controls in the context-sensitive area 304 in accordance with an embodiment of the present invention.

Fig. 8 is an illustrative screen frame of a UI in a TV listing mode which provides an electronic programming guide (EPG) in accordance with an embodiment of the present invention.

Fig. 9 depicts an example layout 900 of a UI with a browser submenu 902 activated in accordance with an embodiment of the present invention.

Fig. 10 depicts an example layout 1000 of a UI with browser controls in the context-sensitive area 304 in accordance with an embodiment of the present invention.

Fig. 11 is an illustrative design for a remote control 1100 in accordance with an embodiment of the present invention.

Fig. 12 depicts a synthetic channel settings page 1200 for user customization of selections of synthetic channels focusing on specialized content categories in accordance with an embodiment of the present invention.

Fig. 13 depicts an example page of a synthetic channel focusing on general news for purposes of illustration.

Fig. 14 depicts an example page of a synthetic channel focusing on sports news for purposes of illustration.

Fig. 15 depicts an example page of a synthetic channel focusing on financial news for purposes of illustration.

Fig. 16 depicts an example page of a synthetic channel focusing on entertainment news for purposes of illustration.

Fig. 17 depicts a user interface which includes a multimedia bar and an embedded media viewer in accordance with an embodiment of the present invention.

Fig. 18 depicts a user interface which includes a multimedia bar for use with pop-up media viewers in accordance with an embodiment of the present invention.

Fig. 19 depicts a pop-up media viewer overlaid over a screen in accordance with an embodiment of the present invention.

Fig. 20 depicts a pop-up text viewer overlaid over a screen in accordance with an embodiment of the present invention.

**DESCRIPTION OF THE SPECIFIC EMBODIMENTS**

Fig. 1 is a schematic diagram depicting a system 100 for distributing Internet content, in addition to TV content, in accordance with an embodiment of the present invention. In accordance with an embodiment of the present invention, the system 100 is integrated with a cable TV distribution system. Such cable TV distribution systems may include cable headends and are well known in the art.

The system 100 includes an Internet 102, a plurality of content sources 104, a plurality of distribution centers (depicted as headends or H/E) 106, and a plurality

of client terminals (depicted as set top boxes or STB) 108. In addition, a content source 104 is depicted as receiving data from data feeds 112, advertisement servers 114, image sources 116, and streaming video sources 118.

The plurality of content sources 104 are coupled to the Internet 102. For example, a content source 104 may comprise a web site portal such as Go2Net.com, or a news web site such as CNN.com, or other types of sources. Each content source 104 may have various data feeds 112, servers 114, and sources 116/118 coupled to it.

For example, news or stock quote feeds 112 may be fed into the content source 104. Servers 114 may provide advertisements for insertion into multimedia content delivered by the content source 104. Sources 116/118 may provide images 116, streaming video 118, and other content to the content source 104. Various other feeds, servers and sources may also be coupled to the content source 104.

The Internet 102 comprises a network of networks and is well known in the art. Communications over the Internet 102 are accomplished using standard protocols such as TCP/IP (transmission control protocol/internet protocol) and other protocols. The Internet 102 is coupled to the plurality of distribution centers 106. For example, a distribution center 106 may comprise a cable headend (H/E).

Each distribution center 106 is coupled to a plurality of client terminals 108. For example, a client terminal 108 may comprise a set top box (STB), a personal computer, an interactive television set, or another type of communication device.

In alternative or in addition to the Internet 102 being used to distribute multimedia content from the content sources 104 to distribution centers 106, communications channels or networks 120 apart from the Internet 102 may couple one or more content source 104 to one or more distribution center 106. One example of such an alternate path for communications is illustrated in Fig. 1. Other configurations are also possible and meant to be included within the scope of the present invention.

Fig. 2 is an illustrative screen frame of a display with a full-size video being displayed. While the screen frame is a still frame, the actual video is a motion video comprising a multitude of frames in sequence.

Fig. 3 depicts an example layout 300 of a user interface (UI) which has been activated in accordance with an embodiment of the present invention. In one embodiment, when the UI is activated, the full-size display (see Fig. 2) shrinks in an "animated" fashion (i.e. with visible motion to a viewer) to occupy a reduced-size area 301 of the display. Alternatively, when the UI is activated, the L configured UI may be superimposed (overlaid) over the full-size display. For example, shrinking the full-size display may be used if the display is showing TV or video content, while superimposing over the full-size display may be used if the display is showing pages which do not scale well. A "menu" button on a remote control unit may be used to activate and deactivate the UI.

The UI includes a group of primary or "permanent" controls 302 on a first side of the reduced-size area 301, a context-sensitive area 304 on a second side of the reduced-size area 301 (perpendicular to the first side), and a logo area 306 at the intersection of the two sides. In the example layout 300 shown in Fig. 3, the primary controls 302 include user ("user name"), TV, mail, browser, and help controls or control icons.

Selection of these primary control icons typically reveals a corresponding submenu. For purposes of illustration, described in detail below are a selection of such submenus. First, an example of a user submenu 502 is described below in relation to Fig. 5. Second, an example of the TV submenu 602 is described below in relation to Fig. 6. Third, an example of a browser submenu 902 is described below in relation to Fig. 9.

The context-sensitive area 304 may display different information (non-selectable items) and control icons (selectable items) depending upon the content in the display area 301. Initially, the context-sensitive area 304 may display information on the TV content currently being displayed in the display area 301. The information may include, for example, channel number/network call letters, program title, and current time.

As the content in the display area 301 varies, so will the information and control icons in the context-sensitive area 304. For example, first, when display area 301 contains TV content, then context-sensitive area 304 may have the information shown in Fig. 3. Second, when the display area 301 contains electronic programming guide (EPG) content, then context-sensitive area 304 may have the controls described in relation to

Fig. 7. Third, when display area 301 contains web content, then context-sensitive area 304 may have the controls described in relation to Fig. 10.

The logo area 306 may display, for example, a logo and name for a service provider. In this example, the service provider is named Charter Communications™.

While the particular layout of Fig. 3 shows a "L" configured UI along the top and left sides of the display, other "L" configurations are also contemplated and within the scope of the present invention. For example, the "L" configured UI may instead be along the bottom and left sides, or the bottom and right sides, or the top and right sides.

In accordance with an embodiment of the present invention, a first pair of arrows on a remote control navigates among the primary controls, and a second pair of arrows (perpendicular to the first pair) navigates among the context-sensitive controls. Switching between navigation among the primary controls and navigation among the context-sensitive controls occurs automatically upon switching between using the first pair of arrows and using the second pair of arrows. An example of a remote control with such arrows is shown in Fig. 11 which is described below.

Fig. 4 is an illustrative screen frame of a UI which has been activated in accordance with an embodiment of the present invention. The frame shown in Fig. 4 is an implementation in close (but not exact) correspondence to the layout 300 of Fig. 3. Like the layout 300 in Fig. 3, the UI of Fig. 4 has primary controls on the left side, a context-sensitive area on the top, and a service provider's logo at the upper left corner.

Regarding the primary controls, "Bob234" is an example name of a currently active user. The "Surf" control corresponds to the browser control. Regarding the context-sensitive area, "Conde Nast Traveler" corresponds to the program title. "Channel 31, DSC" corresponds to the channel/network call letters. And, finally, "1:02 pm 02/28/00" corresponds to the current time (and date).

Fig. 5 depicts an example layout 500 of an UI with a user submenu 502 activated in accordance with an embodiment of the present invention. The user submenu 502 is activated by selecting the "user name" on-screen control from the group of primary controls 302. The user submenu 502 may include various selections.

The "family" user is the default selection when the UI is activated. In one embodiment, the family user will be able to access only content which is accessible to all other users. In other words, the family user will have a "permission space" which is the intersection of permission spaces of all other users. Advantageously, this feature does not require a password to be entered upon turning on the TV. Nevertheless, this feature may be used to prevent children from accessing excessively violent or adult-oriented content. Moreover, the protection provided may extend to both TV and Internet content.

User #2, user #3, ..., user #N, may be individual user names, each of which may have a password to protect against entry by an unauthorized person. For example, the different users may correspond to members of a family. These user names may be sorted alphabetically in the user submenu 502. When an individual user name is selected and password, if any, entered correctly, then the user name becomes the active user.

The "manage users" and "settings" selections may be used to perform such function as: editing user name, password, and other user-related information for a specified user account; allowing users to block certain emails; allowing a user with administrative privileges to add or remove users and change user privileges; and so on.

Fig. 6 depicts an example layout 600 of a UI with a TV submenu 602 activated in accordance with an embodiment of the present invention. The TV submenu 602 is activated by selecting the "tv" on-screen control from the group of primary controls 302. The TV submenu 602 may include various selections.

The "listing" selection provides an electronic programming guide (EPG) to broadcast TV content. When the EPG is provide, corresponding controls are provided in the context-sensitive area 304 as described below in relation to Fig. 7. An example of such an EPG within the UI is illustrated in Fig. 8 which is also described below.

The "info" selection provides information relating to the TV program currently being viewed in the display area 301. The information may include a brief description of the program, names of actors/actresses, copyright year, and so on.

The TV "favorites" selection provides a user with a list of his/her favorite TV channels. When a TV channel is selected from the favorite list, then the embedded TV display changes to that channel.

5 N (where N is a positive integer) TV channels viewed. For example, if N = 9, then video images of the 9 most recently viewed TV channels may be shown in a 3x3 matrix configuration in the embedded display 301. The number N may be fixed, or it may be user selectable.

The TV "search" selection provides a mechanism to search electronic 10 program guide (EPG) listings for a particular program or programs. The search may be by program title, type of program (e.g., "basketball" may be searched to find basketball games being broadcast), by actor/actress, and so on.

These and other selections may be provided in the TV submenu 602. For example, "recent links" and "channel setup" selections are depicted in the TV submenu 15 602 of Fig. 6. The "recent links" selection provides access to hyperlinks recently received via a mechanism such as an ATVEF (Advanced TV Enhancement Forum) trigger. ATVEF is a cross-industry alliance of companies from broadcast and cable networks, television transport, consumer electronics, and personal computer industries. The "channel setup" selection allows a user to specify which TV channels are included as 20 channels to tune to as part of the channel up/down tuning sequence.

Fig. 7 depicts an example layout 700 of a UI with television listing controls in the context-sensitive area 304 in accordance with an embodiment of the present invention. The television listing controls are provide when the display area 301 is used to provide an electronic programming guide (EPG).

25 The television listing controls shown in Fig. 7 include a "change day" control, an EPG "search" control, and a "stay on channel" control. The "change day" control allows the user to change the day of the program grid being shown by the EPG. The EPG "search" control provides access to a mechanism to search EPG listings for a particular program or programs. The "stay on channel" control comprises a toggle 30 control to activate/deactivate this option. When the option is deactivated, then the TV tuner actively tunes to the selected channel in the program grid of the EPG. When the

option is activated, then the TV tuner remains on the channel that was being displayed before entering the EPG.

Fig. 8 is an illustrative screen frame of a UI in a TV listing mode which provides an electronic programming guide (EPG) in accordance with an embodiment of the present invention. The frame shown in Fig. 8 is an implementation in close (but not exact) correspondence to the layout 700 of Fig. 7. (The frame of Fig. 8, for example, does not show a "stay on channel" toggle control.) The EPG shown provides a programming grid including rows representing different channels, and columns representing different timeslots. Other implementations of an EPG are also possible.

5 10 15 20 25 30

Fig. 9 depicts an example layout 900 of a UI with a browser submenu 902 activated in accordance with an embodiment of the present invention. The browser submenu 902 is activated by selecting the "browser" on-screen control from the group of primary controls 302. The browser submenu 902 may include various selections.

The "home" selection may provide access to a web page designated by a service provider (e.g., a MSG) as its "home" page. In one embodiment, when going to the home page, the L configured UI retracts, so that the home page is shown on a full-size screen.

The "user defined" selections provide access to specialized web pages which may be focused to various categories of content. For example, the specialized web pages may focus on categories such as news, money, sports, weather, entertainment, and others. Again, in one embodiment, when going to a specialized web page, the L configured UI retracts, so that the specialized page is shown on a full-size screen.

These and other selections may be provided in the browser submenu 902. For example, "more," "go to," browser "favorites," and browser "search" selections are depicted in the browser submenu 902 shown in Fig. 9. The "more" button provides access to other categories of content in addition to those specified by the "user defined" selections described above. The "go to" button provides a query text box which allows a user to specify a URL to be displayed in the browser. The browser "favorites" button provides access to an organized data structure of favorite links. These browser favorites may be provided separately from the TV favorites, or they may be provided together in an integrated data structure. The browser "search" control provides access to a mechanism

to search for particular Internet or Web content. The browser search may be provided separately from the EPG search, or they may be provided together in an integrated search feature.

Fig. 10 depicts an example layout 1000 of a UI with browser controls in 5 the context-sensitive area 304 in accordance with an embodiment of the present invention. The browser controls are provided when the display area 301 is used to access World Wide Web content and other similar hyperlinked content.

In the embodiment shown in Fig. 10, the left and right arrows 1002 may be individually selected. The left arrow scrolls or shifts the browser controls one button to 10 the left. For example, in Fig. 10, the left arrow would cause the "home" button 1004 to scroll "behind" the arrows 1002 and a control button (not shown) to the right of the "reload" button 1014 to become visible at the right side of the context-sensitive area 304. Similarly, the right arrow scrolls or shifts the browser controls one button to the right.

In the embodiment shown in Fig. 10, the "home" button 1004 may provide 15 access to a web page designated by a service provider (e.g., a MSO) as its "home" page. The "faves" or favorites button 1006 provides access to a list of web pages or URLs that the user selects as his/her favorites. The "save" button 1008 enables a user to save a web page currently being displayed as a favorite page. The "go to" button 1010 provides a query text box which allows a user to specify a URL to be displayed in the browser. The "search" button 1012 provides access to a mechanism to search for particular Internet or 20 Web content. The "reload" button 1014 causes the content currently in the display 301 to be refreshed.

Other buttons may be provided to the right of the "reload" button 1014. In one embodiment, the other buttons may include a "print" button, a "Find" button, a "send" 25 button, and an "info" button. The "print" button provides for printing, with various options, of the web page being displayed. The "find" button provides for finding a specified text string within the web page being displayed. The "send" button provides for sending an email with the web page being displayed or its URL attached thereto or contained therein. Finally, the "info" button provides additional information about the 30 web page being displayed.

Fig. 11 is an illustrative design for a remote control 1100 in accordance with an embodiment of the present invention. Many other designs with similar functionality are, of course, possible and would be within the scope of the present invention.

5 The menu button 1102 may be used to activate and deactivate the UI as described above in relation to Fig. 3. The "Go To TV" button 1103 returns the display to a full-screen television display as illustrated by Fig. 2.

The up arrow 1108 and down arrow 1110 may be used to navigate among the primary controls 302. The left arrow 1104 and right arrow 1106 may be used to 10 navigate among controls in the context-sensitive area 304. Switching between navigation among the primary controls and navigation among the context-sensitive controls occurs automatically upon switching between using the up/down arrows 1108/1110 and using the left/right arrows 1104/1106. The "Go" button (which may also be designated the "OK" button) selects the screen object currently pointed to and triggers whatever event is 15 associated with the object.

In accordance with an embodiment of the present invention, the user interface may advantageously be user customizable to speed-up and facilitate access to content desired by the user. For example, options or selections may be customizable by the user to be integrated with the user interface. In one particular instance, selections of 20 synthetic channels focusing on specialized content categories may be chosen by a user to be integrated with the user interface.

Fig. 12 depicts a synthetic channel settings page 1200 for user customization of selections of synthetic channels focusing on specialized content categories in accordance with an embodiment of the present invention. This page 1200 may be reached, for example, by way of the settings selection from the user submenu 502 depicted in Fig. 5 and described above in relation thereto. In particular, the settings selection may lead to a more general user settings page which may in turn lead to the 25 synthetic channel settings page 1200.

The synthetic channel settings page 1200 depicted in Fig. 12 includes a header 1202, a logo 1204, a settings control 1206, a help control 1208, a plurality of user 30 customizable selections of synthetic channels 1210, and a "done" button 1212. The

header 1202 may or may not include selectable elements. The logo 1204 may be the same as the logo area 306 in Fig. 3. The settings control 1206 may be a control which leads to a submenu of various settings pages, one of which would be the synthetic channel settings page 1200. The plurality of user customizable selections of synthetic channels for 5 1210 may allow the user to select several (for example, four) synthetic channels for integration, for example, into the browser submenu 902 depicted in Fig. 9. As depicted in Fig. 12, the selections may be made by pop-up menus, but other mechanisms for making the selections may also be utilized. The done button 1212 would be pressed when a user 10 is finished selecting the synthetic channels.

Figs. 13-16 depict example pages of synthetic channels focusing on news categories for purposes of illustration. Fig. 13 depicts an example page of a synthetic channel focusing on general news. Fig. 14 depicts an example page of a synthetic channel focusing on sports news. Fig. 15 depicts an example page of a synthetic channel focusing on financial news. Finally, Fig. 16 depicts an example page of a synthetic 15 channel focusing on entertainment news.

The example pages of synthetic channels depicted in Figs. 13-16 include multimedia bars as part of the user interface to provide a unified mechanism for user-friendly integrated access to various types (video, audio, and text) of digital multimedia content. Such multimedia bars are described in further detail below in relation to Figs. 20 17-20.

However, the synthetic channels may be more specific and more specialized than the pages in Figs. 13-16. For example, instead of focusing on sports news in general, synthetic channels may focus more specifically on news relating to particular favorite sports of a user, such as basketball, baseball, football, soccer, and so 25 on. A synthetic channel may also focus on one or more specific favorite sports team of a user, such as the Portland Trailblazers basketball team, and/or the Seattle Mariners baseball team, and/or the Seattle Seahawks football team. As another example, a synthetic channel may focus on news relating to one or more region of the world or one or more country. As yet another example, a synthetic channel may focus on one or more particular area of finance, such as technology stocks, or on particular companies or stocks. As a final example, a synthetic channel may focus on one or more particular type 30 or genre of entertainment, or on particular entertainers or celebrities or shows.

header 1202 may or may not include selectable elements. The logo 1204 may be the same as the logo area 306 in Fig. 3. The settings control 1206 may be a control which leads to a submenu of various settings pages, one of which would be the synthetic channel settings page 1200. The plurality of user customizable selections of synthetic channels for 5 1210 may allow the user to select several (for example, four) synthetic channels for integration, for example, into the browser submenu 902 depicted in Fig. 9. As depicted in Fig. 12, the selections may be made by pop-up menus, but other mechanisms for making the selections may also be utilized. The done button 1212 would be pressed when a user 10 is finished selecting the synthetic channels.

Figs. 13-16 depict example pages of synthetic channels focusing on news categories for purposes of illustration. Fig. 13 depicts an example page of a synthetic channel focusing on general news. Fig. 14 depicts an example page of a synthetic channel focusing on sports news. Fig. 15 depicts an example page of a synthetic channel focusing on financial news. Finally, Fig. 16 depicts an example page of a synthetic 15 channel focusing on entertainment news.

The example pages of synthetic channels depicted in Figs. 13-16 include multimedia bars as part of the user interface to provide a unified mechanism for user-friendly integrated access to various types (video, audio, and text) of digital multimedia content. Such multimedia bars are described in further detail below in relation to Figs. 20 17-20.

However, the synthetic channels may be more specific and more specialized than the pages in Figs. 13-16. For example, instead of focusing on sports news in general, synthetic channels may focus more specifically on news relating to particular favorite sports of a user, such as basketball, baseball, football, soccer, and so 25 on. A synthetic channel may also focus on one or more specific favorite sports team of a user, such as the Portland Trailblazers basketball team, and/or the Seattle Mariners baseball team, and/or the Seattle Seahawks football team. As another example, a synthetic channel may focus on news relating to one or more region of the world or one or more country. As yet another example, a synthetic channel may focus on one or more particular area of finance, such as technology stocks, or on particular companies or stocks. As a final example, a synthetic channel may focus on one or more particular type 30 or genre of entertainment, or on particular entertainers or celebrities or shows.

In addition, the synthetic channels may include not only digital multimedia content, but also television broadcast content which may be live or digitally pre-recorded. The pre-recorded television broadcast content may be stored locally at a set top unit or remotely at a server unit.

Fig. 17 depicts a user interface which includes a multimedia bar and an embedded media viewer in accordance with an embodiment of the present invention. The depiction in Fig. 17 includes eleven features labeled using the letters A, B, C, D, E, F, G, H, I, J, and K.

As described below, the features may (or may not) be selectable.

5 Preferably, selection is accomplished using arrow or other buttons on a remote control device. Selection may also be accomplished by other means (mouse pointing devices, trackballs, joysticks, touch screens, voice recognition, and so on). When a feature or object is selected, it may be highlighted or marked in some manner to so indicate its selection. For example, feature labeled G in Fig. 17 is depicted as being highlighted by a "selection rectangle" outlining the feature.

10 Once a feature is selected, it may be activated. Such activation may be accomplished by pressing an "OK" or similar button on the remote control device. Activation may also be accomplished by other means (clicking a mouse button, etc.).

The feature labeled A in Fig. 17 comprises one of two selectable "more" 15 buttons. The two more buttons point in opposing directions. In this embodiments, the opposing directions are up and down, but in other embodiments the opposing directions may be left and right. When a more button is activated, the current set of reduced-size images will be scrolled to the next set of reduced-size images which are not currently visible in the direction selected. If there are no more reduced-size images in the direction indicated by the more button, then that more button will be hidden (neither visible nor available) in the multimedia bar.

The feature labeled B in Fig. 17 comprises one of a set of selectable 20 reduced-size images. Preferably, these reduced-size images should be of sufficient quality and layout so that they can be recognized by a person with normal vision on an ordinary sized television from about 10 feet away. Preferably, the reduced-size image will provide a good visual indicator about the content of the associated digital content.

When the digital content comprises a streaming video clip, then the reduced-size image may frequently (but not necessarily) be a first frame of the streaming video clip.

Each reduced-size image relating to a subject matter may operate as a hyperlink to associated digital content. A reduced-size image may be selected using means as described above. If the reduced-size image is located at an edge (either first or last position of the multimedia bar, and there is a next image "hidden" beyond the edge, then a logical scroll of the reduced-size images occur so as to reveal that next image.

Once the reduced-size image has been selected, then it may be activated using means as described above. Once activated, the associated digital content will be presented. For example, if the associated digital content comprises a streaming video clip, then the video clip will be loaded into the viewing window for playback. In a preferred embodiment, such playback may be initiated automatically if there is sufficient throughput to maintain the clips required bit rate. If not, the viewer may buffer the video stream automatically.

Possibly in some embodiments, the associated digital content may comprise a still image. In that case, when the reduced-size image is activated, then the image will be loaded into an image viewer for display (typically at full-size or at least a size greater than the reduced-size image).

The feature labeled C in Fig. 17 comprises an area to display a caption for content being displayed by the embedded media viewer. In a preferred embodiment, the caption comprises non-selectable text.

The feature labeled D in Fig. 17 comprises a viewing window for displaying content by the embedded media viewer. In a preferred embodiment, the viewing window may display streaming video clips. Preferably, the streaming video clips will be created such that a first frame of the clip provides a good visual indicator about the clip's contents.

The feature labeled E in Fig. 17 comprises an elapsed time indicator for the content being displayed by the embedded media viewer. Such an elapsed time indicator would be used to display the amount of elapsed time during play of streaming video by the embedded media viewer.

The feature labeled F in Fig. 17 comprises a selectable fast forward button for the content being displayed by the embedded media viewer. In a preferred embodiment, activating the fast forward button causes the streaming media clip to be fast forwarded until it either reaches the end of the streaming media clip or until the play button is selected.

The feature labeled G in Fig. 17 comprises a selectable play/pause button. In a preferred embodiment, such a play/pause button may comprise a two-state button. When the streaming media clip is playing in the embedded media viewer, the play/pause button is in a "pause" state where it resembles and represents a pause button (not illustrated in Fig. 17). Activating the play/pause button from pause state causes pausing of the streaming media clip and further causes the play/pause button to change to a "play" state where it resembles and represents a play button (as illustrated in Fig. 17). Activating the play/pause button from play state causes playing of the streaming media clip and further causes the play/pause button to change to the "pause" state

The feature labeled H in Fig. 17 comprises a selectable rewind button. In a preferred embodiment, activating the rewind button causes the streaming media clip to rewind until either the beginning of the clip is reached or until the play button is activated.

The feature labeled I in Fig. 17 comprises an area to display a caption for subject matter depicted in a corresponding reduced-size image. In a preferred embodiment, the caption comprises non-selectable text.

The feature labeled J in Fig. 17 comprises a video icon corresponding to a subject matter. In a preferred embodiment, the video icon is non-selectable and indicates the presence of a streaming video clip associated with the subject matter. Such a streaming video clip may be viewable by way of the viewing window (D) described above.

The feature labeled K in Fig. 17 comprises an audio icon corresponding to a subject matter. In a preferred embodiment, the audio icon is non-selectable and indicates the presence of a streaming audio clip associated with the subject matter. Such audio content may be played on an audio system either integrated with the video system or external to the video system.

If both video and audio icon are present in correspondence to a subject matter, then both a streaming video clip and a streaming audio clip are associated with the subject matter. Such streaming video and audio are preferably in synchronization with each other and played together synchronously.

Fig. 18 depicts a user interface which includes a multimedia bar for use with pop-up media viewers in accordance with an embodiment of the present invention. Such an embodiment may be preferable for use on a user interface page where multimedia presentation functionality is desired, but where there is insufficient space available on the page for an embedded viewer. The depiction in Fig. 18 includes six features labeled using the letters A, B, C, D, E, and F.

The feature labeled A in Fig. 18 (like feature A in Fig. 17) comprises one of two selectable "more" buttons. The two more buttons point in opposing directions. In this embodiment, the opposing directions are left and right, but in other embodiments the opposing directions may be up and down. When a more button is activated, the current set of reduced-size images will be scrolled to the next set of reduced-size images which are not currently visible in the direction selected. If there are no more reduced-size images in the direction indicated by the more button, then that more button will be hidden (neither visible nor available) in the multimedia bar.

The feature labeled B in Fig. 18 comprises a selectable text icon corresponding to a subject matter. Each text icon may operate as a hyperlink to associated text content. If there is only text content corresponding to a subject matter (i.e. no video, no audio, and no reduced-size image), then the text icon may be larger such that it overlays the space where the reduced-size image would otherwise be. The text icon may be selected using means as described above. Once the text icon has been selected, then it may be activated using means as described above. Once activated, the text content may be viewable by way of a pop-up text viewer as described below in relation to Fig. 20.

The feature labeled C in Fig. 18 (like feature B in Fig. 17) comprises one of a set of selectable reduced-size images. Preferably, these reduced-size images should be of sufficient quality and layout so that they can be recognized by a person with normal vision on an ordinary sized television from about 10 feet away. Preferably, the reduced-size image will provide a good visual indicator about the content of the associated digital

content. When the digital content comprises a streaming video clip, then the reduced-size image may frequently (but not necessarily) be a first frame of the streaming video clip.

Each reduced-size image may operate as a hyperlink to associated digital content relating to a subject matter. A reduced-size image may be selected using means as described above. For purposes of illustration, the reduced-size image to the left of the one labeled C in Fig. 18 is shown to be currently selected by the selection rectangle outlining it. If the reduced-size image is located at an edge (either first or last position of) the multimedia bar, and there is a next image "hidden" beyond the edge, then a logical scroll of the reduced-size images occur so as to reveal that next image.

Once the reduced-size image has been selected, then it may be activated using means as described above. Once activated, the associated digital content will be presented. For example, if the associated digital content comprises a streaming video clip, then the video clip will be loaded into the viewing window for playback. In a preferred embodiment, such playback may be initiated automatically if there is sufficient throughput to maintain the clips required bit rate. If not, the viewer may buffer the video stream automatically.

Possibly in some embodiments, the associated digital content may comprise a still image. In that case, when the reduced-size image is activated, then the image will be loaded into an image viewer for display (typically at full-size or at least a size greater than the reduced-size image).

The feature labeled D in Fig. 18 comprises an audio icon corresponding to a subject matter. In a preferred embodiment, the audio icon is non-selectable and indicates the presence of a streaming audio clip associated with the subject matter. Such audio content may be played on an audio system either integrated with the video system or external to the video system.

The feature labeled E in Fig. 18 comprises a video icon corresponding to a subject matter. In a preferred embodiment, the video icon is non-selectable and indicates the presence of a streaming video clip associated with the subject matter. Such a streaming video clip may be viewable by way of a pop-up media viewer as described below in relation to Fig. 19.

Again, if both video and audio icon are present in correspondence to a subject matter, then both a streaming video clip and a streaming audio clip are associated with the subject matter. Such streaming video and audio are preferably in synchronization with each other and played together synchronously.

The feature labeled F in Fig. 18 comprises a caption (or headline) relating to the subject matter of a selected reduced-size image or a selected text icon. The caption is displayed upon selection (not activation) of the reduced-size image or text icon, and the caption changes as the selected image or icon changes.

Fig. 19 depicts a pop-up media viewer overlayed over a screen in accordance with an embodiment of the present invention. The depiction in Fig. 19 includes ten features labeled using the letters A, B, C, D, E, F, G, H, I, and J.

The feature labeled A in Fig. 19 comprises an area to display a caption for content being displayed by the pop-up media viewer. In a preferred embodiment, the caption comprises non-selectable text.

The feature labeled B in Fig. 19 comprises a pop-up frame. The pop-up frame delimits the window for the pop-up media viewer.

The feature labeled C in Fig. 19 comprises an elapsed time indicator for the content being displayed by the pop-up media viewer. Such an elapsed time indicator would be used to display the amount of elapsed time during play of streaming video by the pop-up media viewer.

The feature labeled D in Fig. 19 comprises a selectable "done" button. Activating the done button causes the pop-up media viewer to be dismissed (go away), returning to the screen or page from which the pop-up media viewer was spawned.

The feature labeled E in Fig. 19 comprises an area to display a text or an image. In a preferred embodiment, the text or image is non-selectable and is used for purposes of brand marketing of the content provider or other business entity.

The feature labeled F in Fig. 19 comprises a selectable fast forward button for the content being displayed by the pop-up media viewer. In a preferred embodiment, activating the fast forward button causes the streaming media clip to be fast forwarded

until it either reaches the end of the streaming media clip or until the play button is selected.

The feature labeled G in Fig. 19 comprises a selectable play/pause button.

In a preferred embodiment, such a play/pause button may comprise a two-state button.

5 When the streaming media clip is playing in the pop-up media viewer, the play/pause button is in a "pause" state where it resembles and represents a pause button (not illustrated in Fig. 19). Activating the play/pause button from pause state causes pausing of the streaming media clip and further causes the play/pause button to change to a "play" state where it resembles and represents a play button (as illustrated in Fig. 19).

10 Activating the play/pause button from play state causes playing of the streaming media clip and further causes the play/pause button to change to the "pause" state activated.

The feature labeled H in Fig. 19 comprises a selectable rewind button. In a preferred embodiment, activating the rewind button causes the streaming media clip to rewind until either the beginning of the clip is reached or until the play button is activated.

15 The feature labeled I in Fig. 19 comprises a viewing window for displaying content by the pop-up media viewer. In a preferred embodiment, the viewing window may display streaming video clips. Preferably, the streaming video clips will be created such that a first frame of the clip provides a good visual indicator about the clip's 20 contents.

The feature labeled J in Fig. 19 comprises a translucent background overlay which is layered over the screen or page from which the pop-up media viewer was spawned. The translucent background overlay serves to de-emphasize the screen or page from which the pop-up media viewer was spawned and to emphasize the pop-up media viewer. In a preferred embodiment, the transparency attribute of the translucent background overlay may be set at 65% or thereabout (say from 50% to 80%).

20 Fig. 20 depicts a pop-up text viewer overlayed over a screen in accordance with an embodiment of the present invention. The depiction in Fig. 20 includes three features labeled using the letters A, B, and C.

The feature labeled A in Fig. 20 comprises a text viewing window for displaying text content. When there is more than one page of text content to be displayed, a scrolling capability is used to move between pages. Preferably, a scrolling capability of a browser portion of the user interface may be used to provide the scrolling capability of the text viewing window.

The feature labeled B in Fig. 20 comprises a translucent background overlay which is layed over the screen or page from which the pop-up text viewer was spawned. The translucent background overlay serves to de-emphasize the screen or page from which the pop-up text viewer was spawned and to emphasize the pop-up text viewer. In a preferred embodiment, the transparency attribute of the translucent background overlay may be set at 65% or thereabout (say from 50% to 80%).

The feature labeled C in Fig. 20 comprises a selectable "done" button. Activating the done button causes the pop-up text viewer to be dismissed (go away), returning to the screen or page from which the pop-up text viewer was spawned.

While specific embodiments and applications of the present invention have been illustrated and described, it is to be understood that the invention is not limited to the precise configuration and components disclosed herein. Various modifications, changes, and variations which will be apparent to those skilled in the art may be made in the arrangement, operation, and details of the methods and systems of the present invention disclosed herein without departing from the spirit and scope of the invention. For example, selecting one of the primary controls 302 (user, TV, browser, etc.) may lead to alternative implementations other than submenus. Instead of submenus, a selection of buttons or a new page with controls may be utilized.

- 15 While specific embodiments and applications of the present invention have been illustrated and described, it is to be understood that the invention is not limited to the precise configuration and components disclosed herein. Various modifications, changes, and variations which will be apparent to those skilled in the art may be made in the arrangement, operation, and details of the methods and systems of the present invention disclosed herein without departing from the spirit and scope of the invention. For example, selecting one of the primary controls 302 (user, TV, browser, etc.) may lead to alternative implementations other than submenus. Instead of submenus, a selection of buttons or a new page with controls may be utilized.
- 16 The feature labeled A in Fig. 20 comprises a text viewing window for displaying text content. When there is more than one page of text content to be displayed, a scrolling capability is used to move between pages. Preferably, a scrolling capability of a browser portion of the user interface may be used to provide the scrolling capability of the text viewing window.
- 17 The feature labeled B in Fig. 20 comprises a translucent background overlay which is layed over the screen or page from which the pop-up text viewer was spawned. The translucent background overlay serves to de-emphasize the screen or page from which the pop-up text viewer was spawned and to emphasize the pop-up text viewer. In a preferred embodiment, the transparency attribute of the translucent background overlay may be set at 65% or thereabout (say from 50% to 80%).
- 18 The feature labeled C in Fig. 20 comprises a selectable "done" button. Activating the done button causes the pop-up text viewer to be dismissed (go away), returning to the screen or page from which the pop-up text viewer was spawned.
- 19 While specific embodiments and applications of the present invention have been illustrated and described, it is to be understood that the invention is not limited to the precise configuration and components disclosed herein. Various modifications, changes, and variations which will be apparent to those skilled in the art may be made in the arrangement, operation, and details of the methods and systems of the present invention disclosed herein without departing from the spirit and scope of the invention. For example, selecting one of the primary controls 302 (user, TV, browser, etc.) may lead to alternative implementations other than submenus. Instead of submenus, a selection of buttons or a new page with controls may be utilized.
- 20 The user interface of claim 1, wherein the user customizable selections comprise synthetic channels focus on specialized content categories.
- 21 The user interface of claim 4, wherein the specialized content categories comprise news categories.

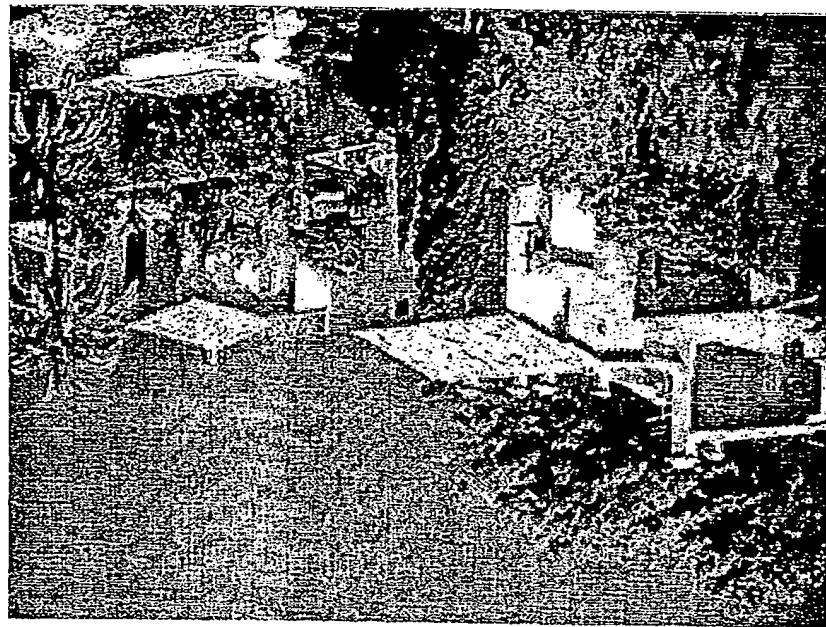
**WHAT IS CLAIMED IS:**

- 1 1. A user interface for displaying multimedia content on a broadband Internet-enabled television system, the user interface comprising:
  - 2 a display area for displaying the multimedia content;
  - 3 a group of primary controls adjacent to the display area, where the group
  - 4 of primary controls is provided whenever the user interface is active; and
  - 5 a plurality of groups of context-sensitive controls adjacent to the display area, where each group of context-sensitive controls is provided when a corresponding type of multimedia content is being displayed on the display area,
  - 6 wherein one of the primary controls provides access to a plurality of user
  - 7 customizable selections;
  - 8
  - 9
  - 10
- 11 2. The user interface of claim 1, wherein the group of primary controls is aligned along a first direction of the display area, wherein each group of context-sensitive controls is aligned along a second direction of the display area, and wherein the first and second directions are perpendicular to each other so as to form a L-shaped configuration.
- 12 3. The user interface of claim 2, wherein a first pair of arrows of an input device are used to navigate among the primary controls, wherein a second pair of arrows on the input device are used to navigate among the context-sensitive controls, wherein the first and second pairs of arrows together form a four-pointed star configuration on the input device, wherein switching from navigation among the primary controls to navigation among the context-sensitive controls occurs automatically upon switching from use of the first pair of arrows to use of the second pair of arrows, and wherein switching from navigation among the context-sensitive controls to navigation among the primary controls occurs automatically upon switching from use of the second pair of arrows to use of the first pair of arrows.
- 13 4. The user interface of claim 1, wherein the user customizable selections comprise synthetic channels focus on specialized content categories.
- 14 5. The user interface of claim 4, wherein the specialized content categories comprise news categories.

- 1       6.   The user interface of claim 5, wherein the news categories include  
2 at least general news, sports news, financial news, and entertainment news.
- 1       7.   The user interface of claim 4, wherein the specialized content  
2 includes categories focused on particular sports and/or specific sports teams.
- 1       8.   The user interface of claim 4, wherein the specialized content  
2 includes categories focused on news relating to a region of the world and/or one or more  
3 countries.
- 1       9.   The user interface of claim 4, wherein the specialized content  
2 includes categories focused on news relating to a particular area of finance and/or  
3 particular companies.
- 1       10.   The user interface of claim 4, wherein the specialized content  
2 includes categories focused on news relating to a particular type of entertainment and/or  
3 particular entertainers or shows.
- 1       11.   The user interface of claim 4, wherein at least one synthetic  
2 channel includes a multimedia bar for integrated access to a plurality of types of digital  
3 content.
- 1       12.   The user interface of claim 11, wherein the multimedia bar  
2 comprises:
  - 3 a plurality of selectable reduced-sized displays, each selectable reduced-  
4 size displays operating as a link to corresponding digital content; and  
5 a plurality of media type icons for use in correspondence with the  
6 selectable reduced-size displays, each media type icon indicating availability of an  
7 associated media type among the corresponding digital content,  
8 wherein the plurality of media type icons include a streaming video icon  
9 and a streaming audio icon.
- 1       13.   The user interface of claim 4, wherein at least one synthetic  
2 channel includes broadcast television content.

- 1       14.   The user interface of claim 13, wherein the broadcast television  
2 content is pre-recorded.
- 1       15.   The user interface of claim 13, wherein the broadcast television  
2 content is live.
- 1       16.   A user interface for displaying multimedia content on a broadband  
2 Internet-enabled television system, the user interface comprising:
  - 3 a display area for displaying the multimedia content;
    - 4 a group of primary controls adjacent to the display area, where the group  
5 of primary controls is provided whenever the user interface is active; and  
6 a plurality of groups of context-sensitive controls adjacent to the display  
7 area, where each group of context-sensitive controls is provided when a corresponding  
8 type of multimedia content is being displayed on the display area,  
9 wherein one of the primary controls provides access to a plurality of user  
10 customizable selections,
    - 11 wherein the user customizable selections comprise synthetic channels  
12 focus on specialized content categories,    - 13 wherein at least one synthetic channel includes a multimedia bar for  
14 integrated access to a plurality of types of digital content, and  
15 wherein at least one synthetic channel includes broadcast television  
16 content.

FIG. 2



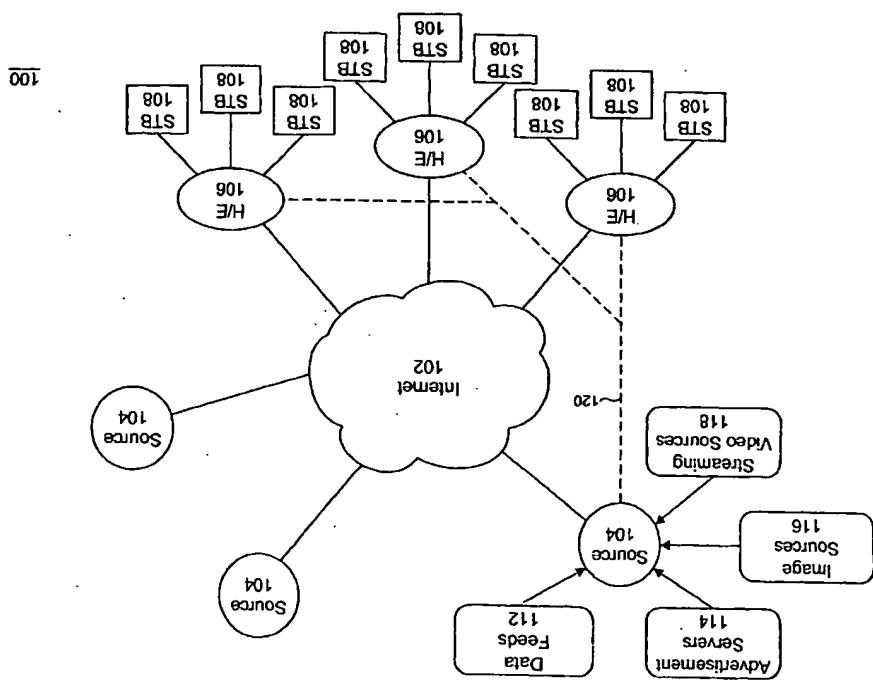
WO 0174063

2/20

PCT/US01/09568

1/20

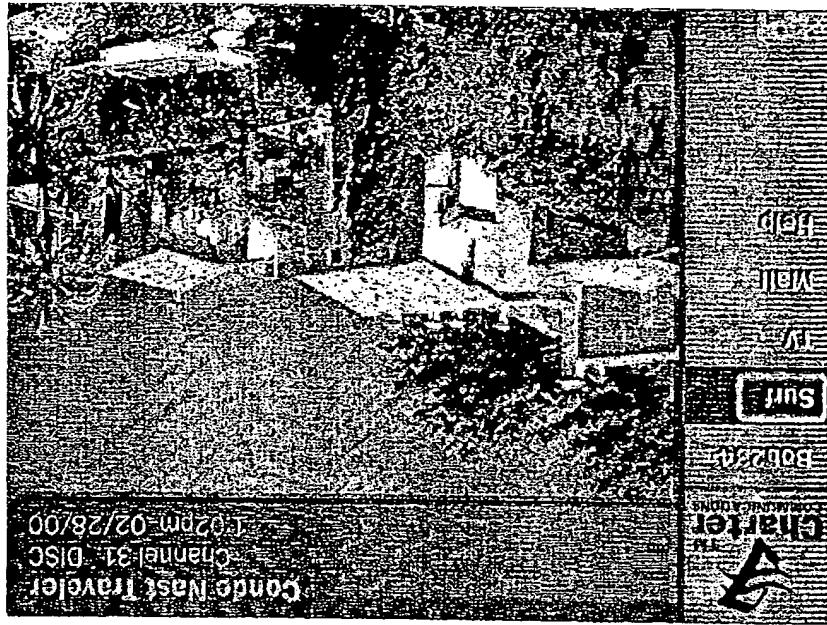
FIG. 1



WO 0174063

PCT/US01/09568

FIG. 4

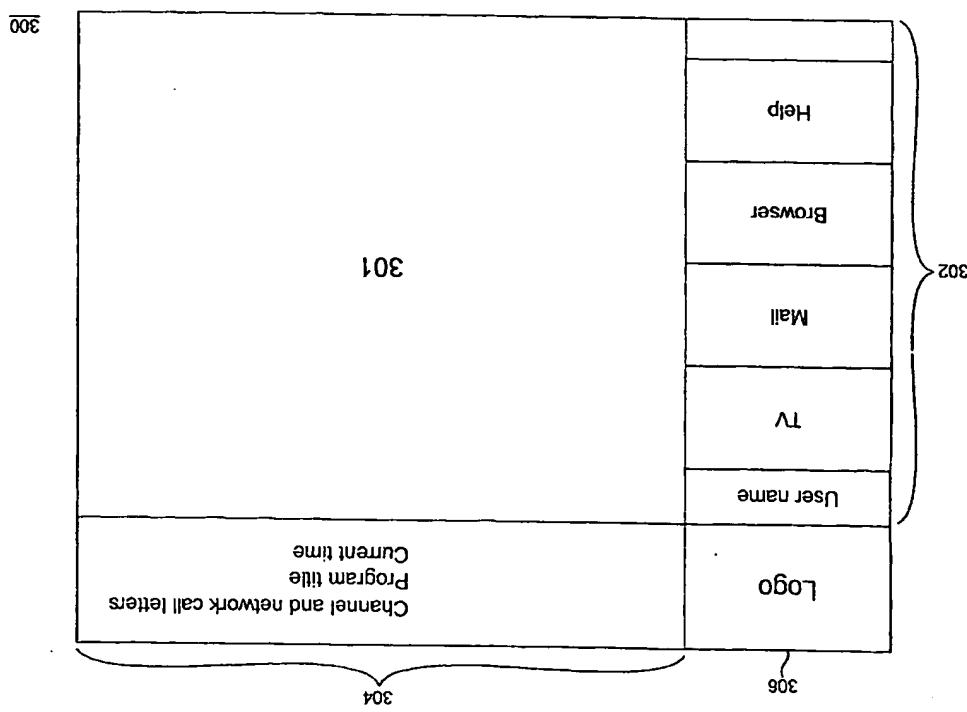


WO 0174063

4/20

PCT/US01/09568

FIG. 3



WO 0174063

3/20

PCT/US01/09568

FIG. 6

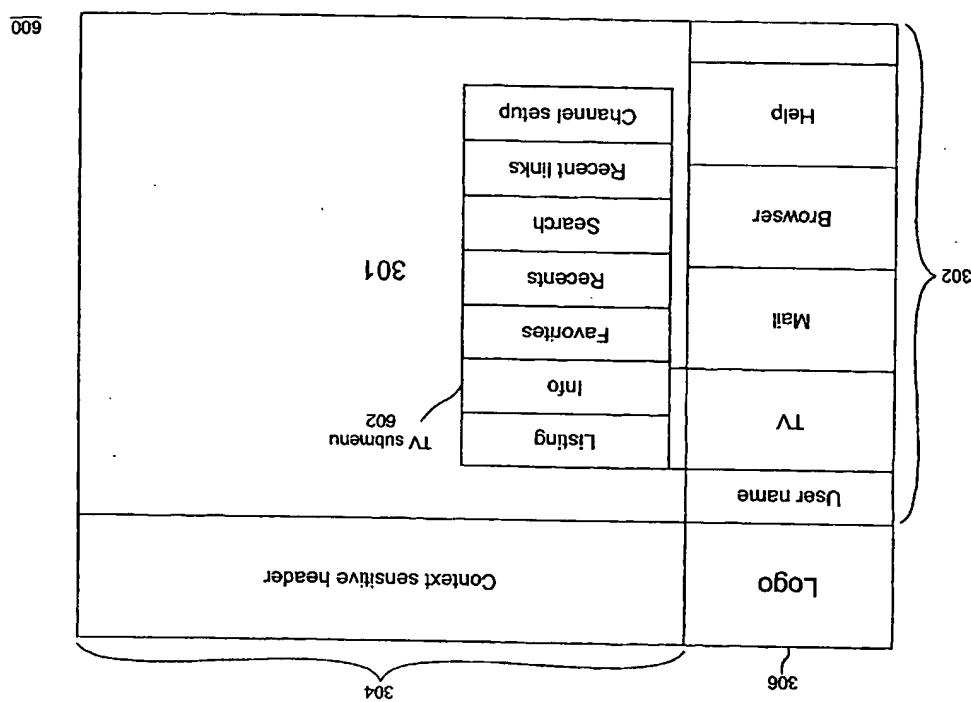


FIG. 5

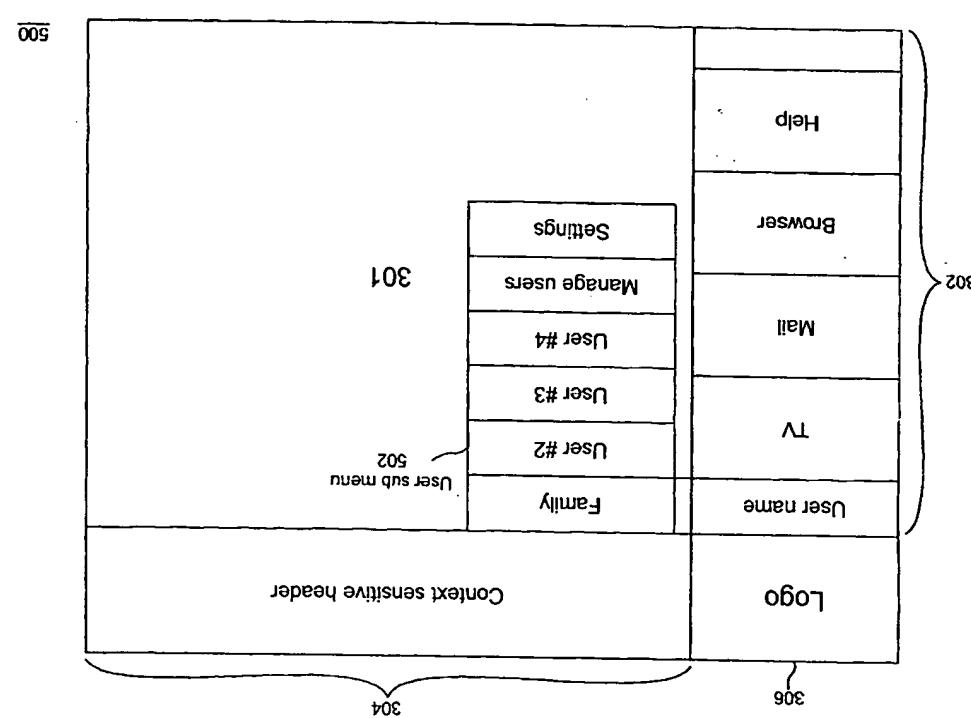
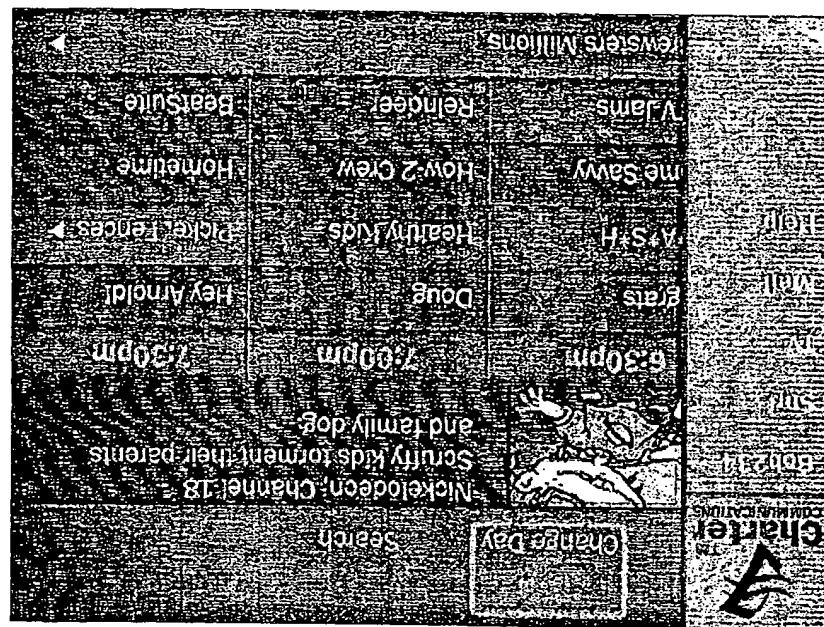


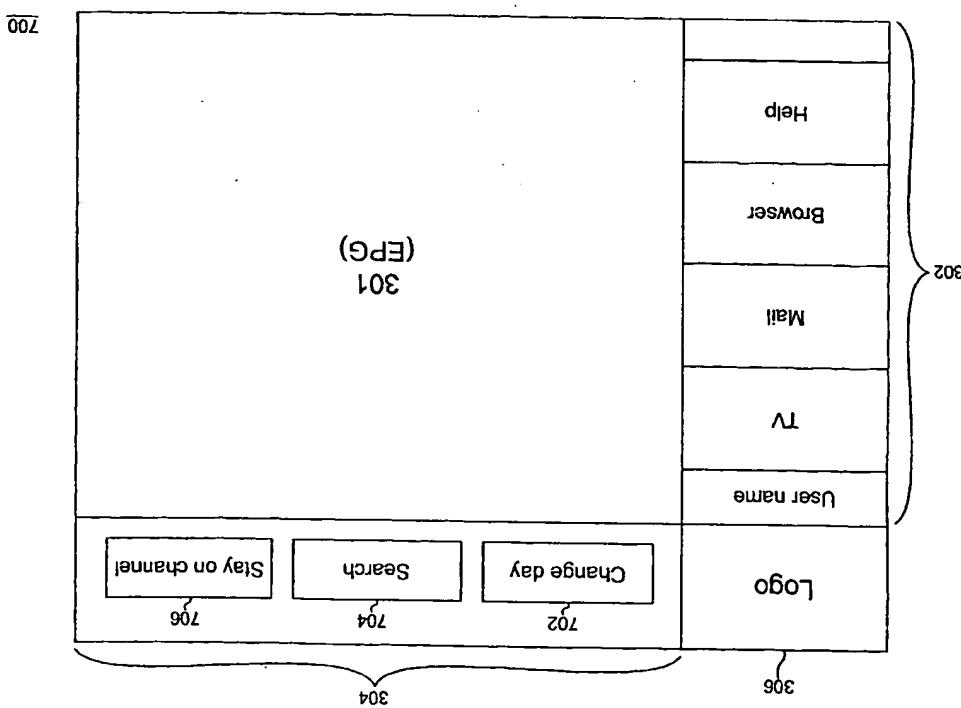
FIG. 8



PCT/US01/09548  
WO 01/74063

7/20

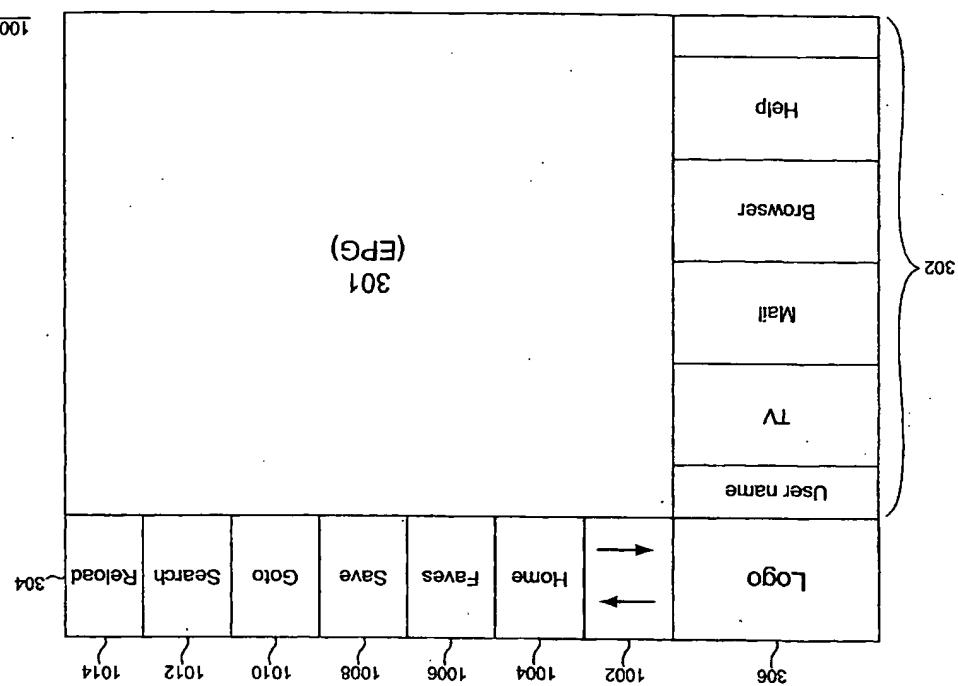
FIG. 7



PCT/US01/09548  
WO 01/74063

7/20

FIG. 10



PCT/US11/09568

10/20

WO 01/174063

PCT/US11/09568

9/20

WO 01/174063

FIG. 9

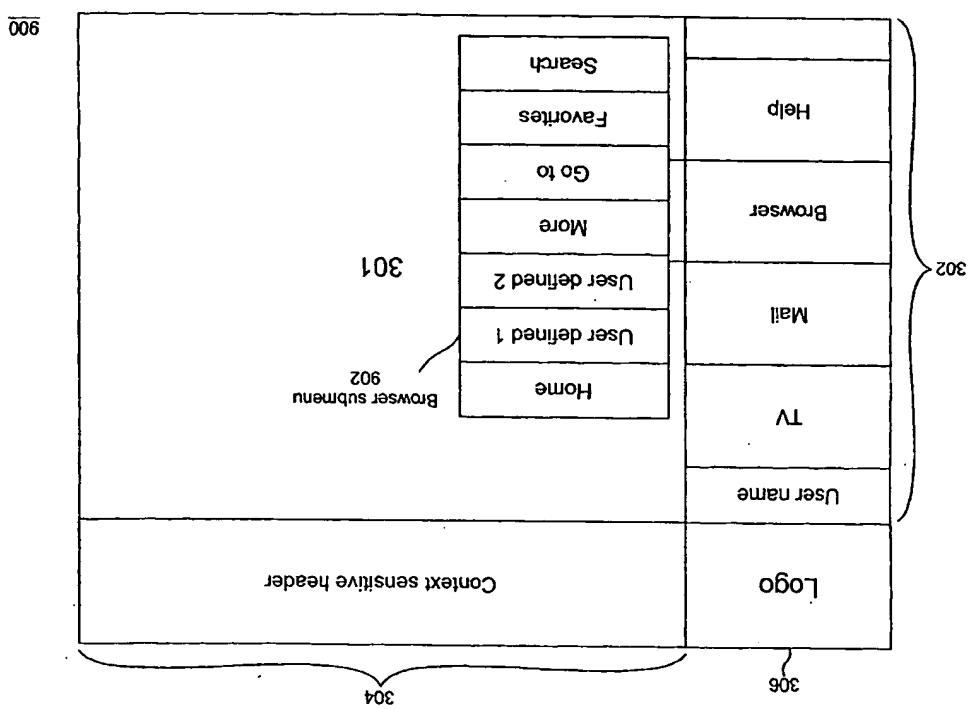


FIG. 12

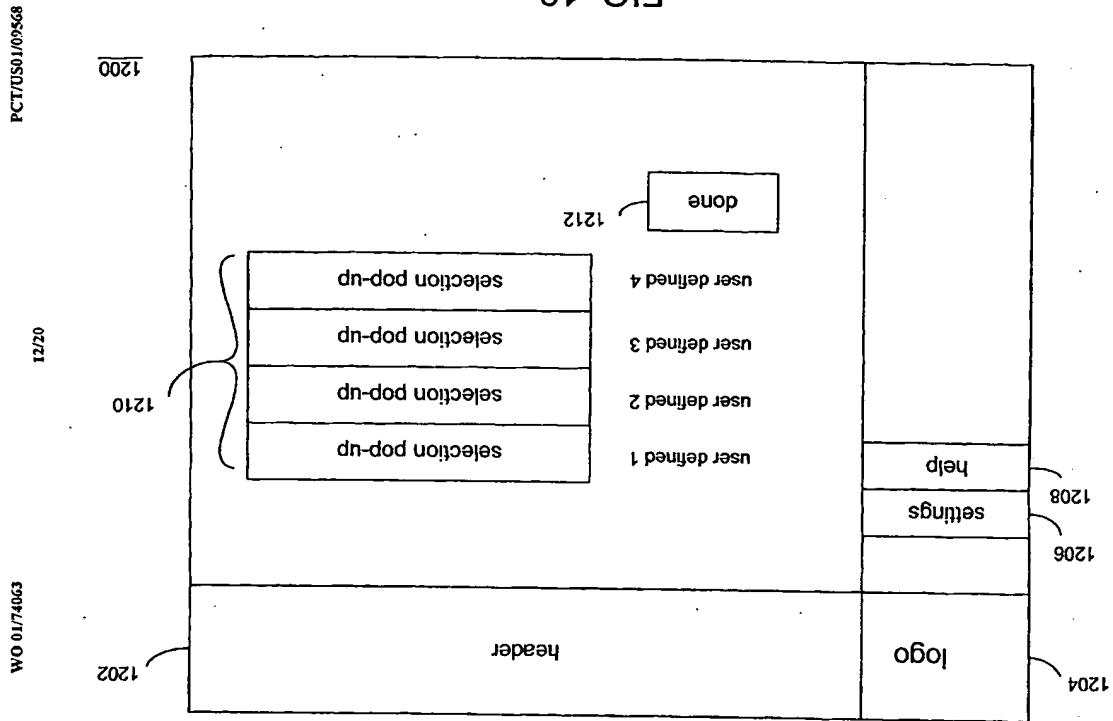


FIG. 11

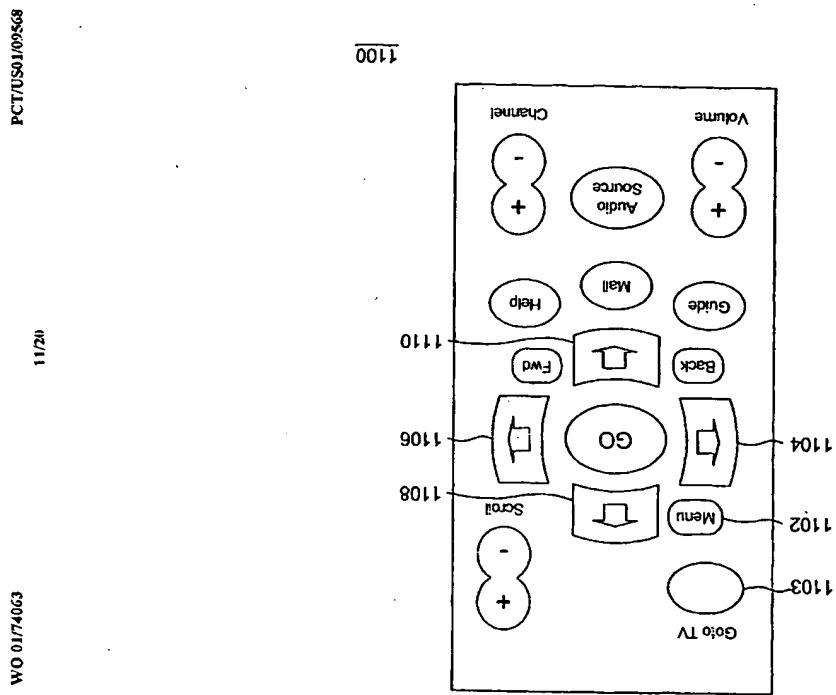


FIG. 14



FIG. 13

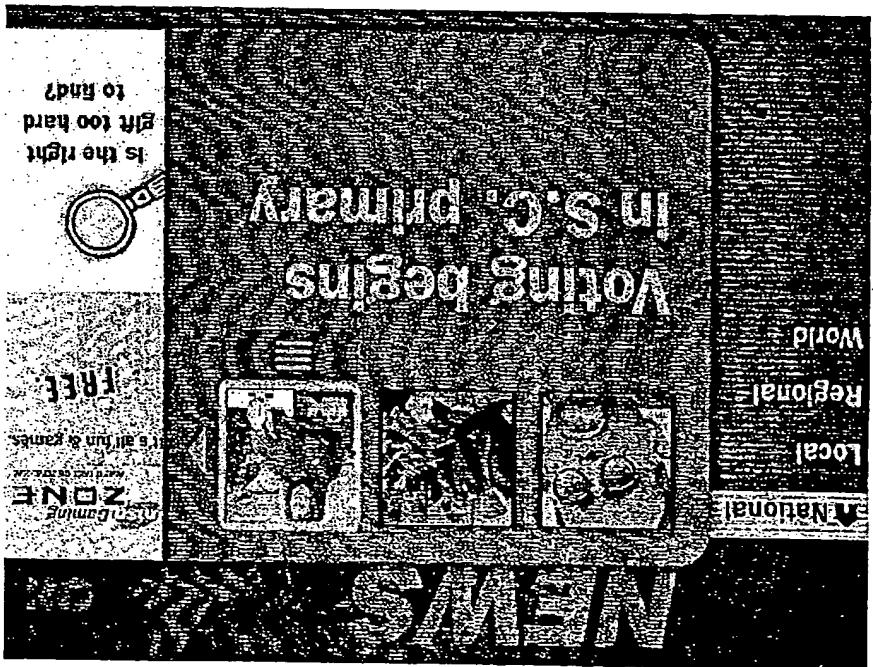


FIG. 16

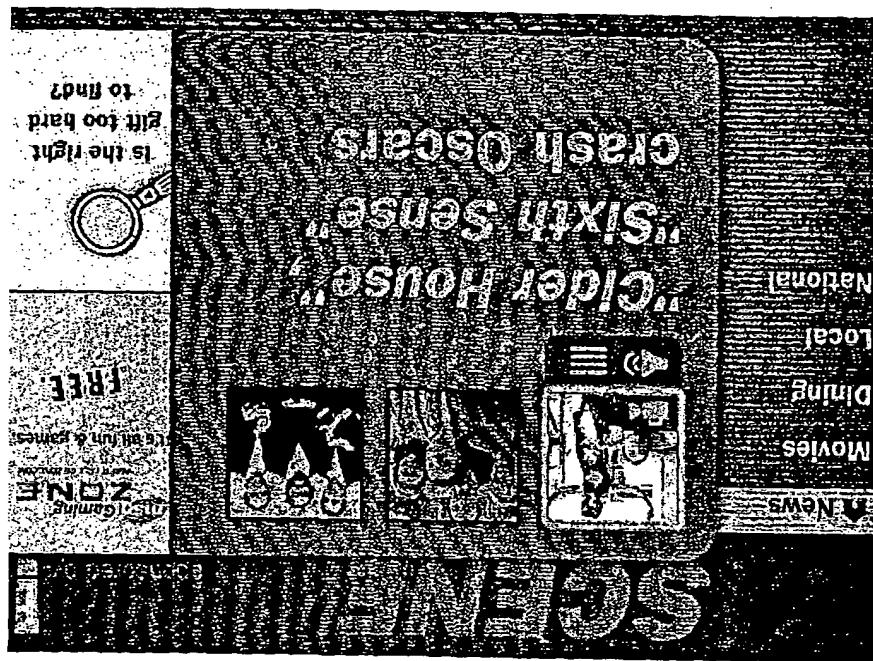


FIG. 15

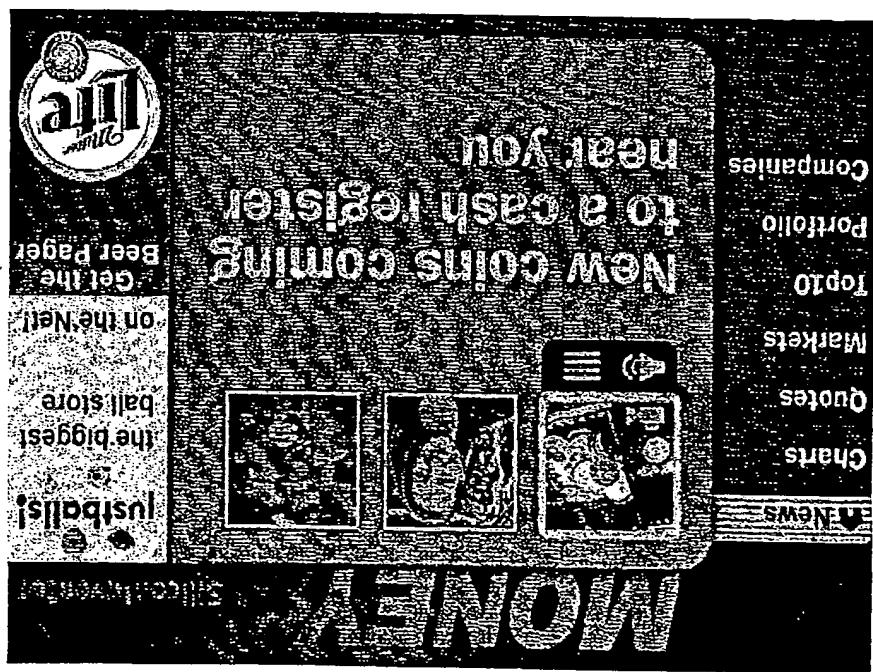


FIG. 18

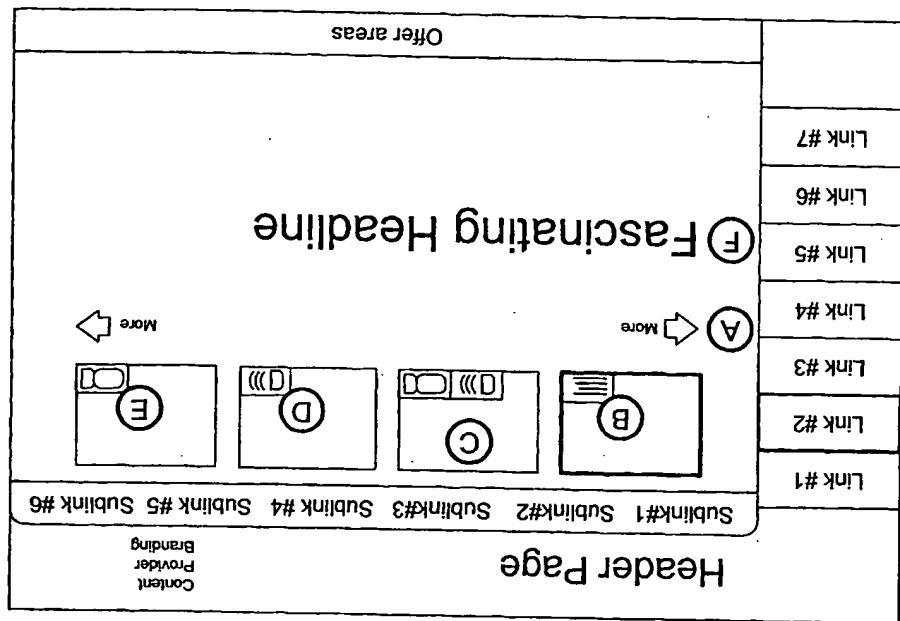
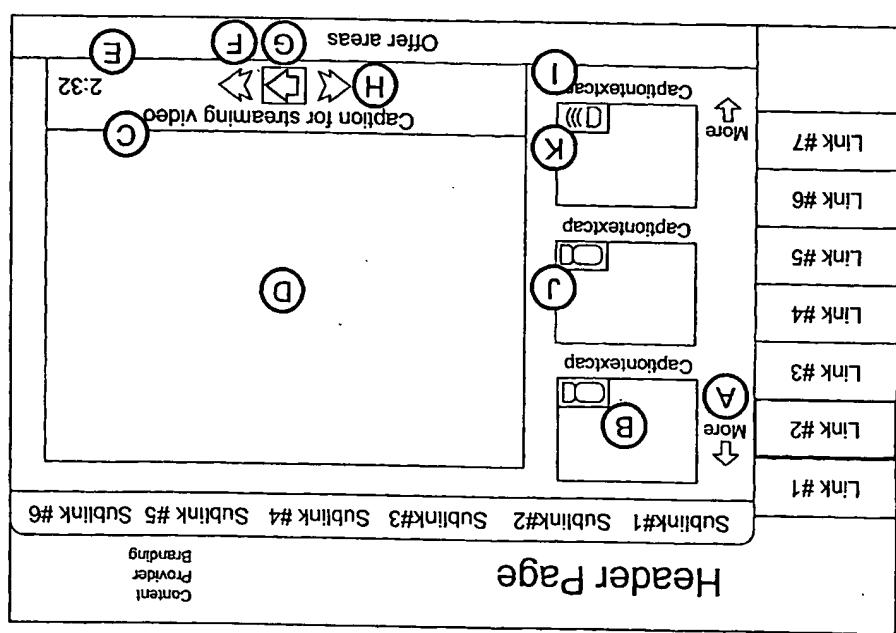


FIG. 17



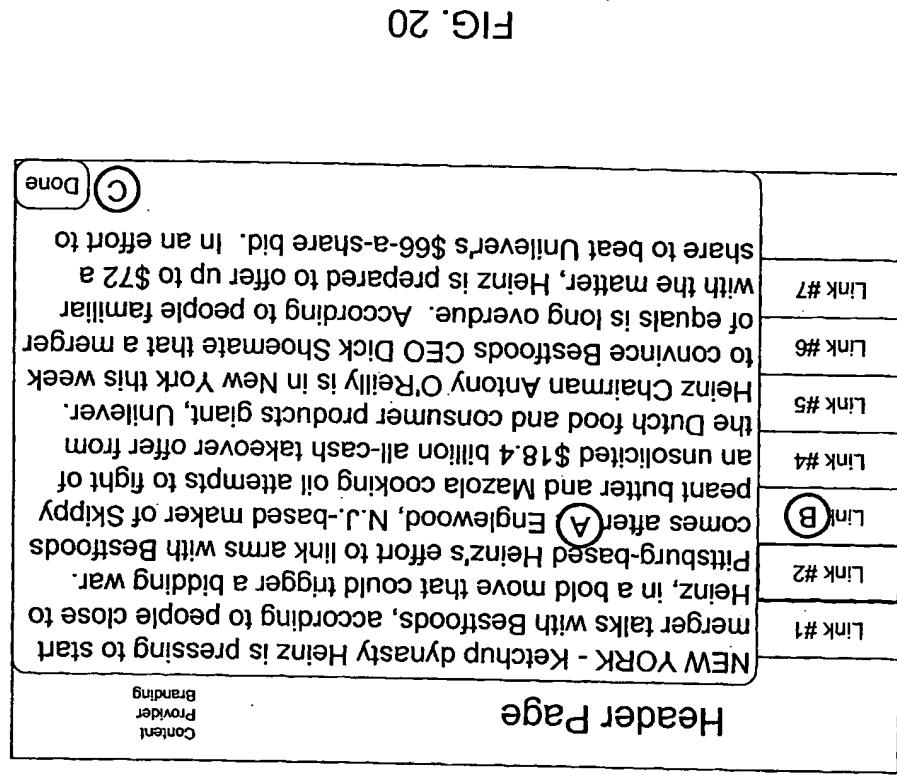
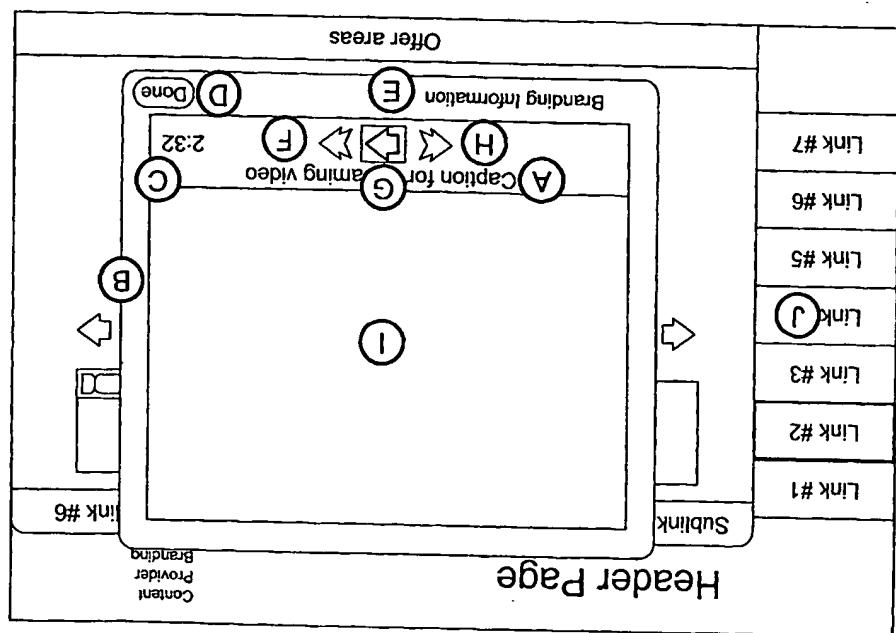


FIG. 19



## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US01/09568

International application No.

PCT/US01/09568

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(T)

US 5/445

725/38,39,40,43,45,47,52

According to International Patent Classification (IPC), or to both national classification and IPC.

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 725/38,39,40,43,45,47,52

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
Please See Continuation Sheet

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category \* Citation of document, with indication, where appropriate, of the relevant passages

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,931,411 A (SMITH) 03 August 1999; see Figs. 6a-6B, col. 1, line 63 to col. 2, line 54	1-16
Y	US 5,659,892 A (KNEE et al.) 31 December 1996; see col. 4, line 40 to col. 6, line 60.	1-16
Y	US 6,123,857 A (MATTHEWS, III et al.) 15 February 2000; see col. 4, line 25 to col. 5, line 15.	1-16
Y	US 5,793,438 A (WEDDARD) 11 August 1998; see col. 2, lines 38-40.	1-16
Y	US 5,675,401 A (YORK et al.) 30 September 1997; see col. 4, line 65 to col. 7, line 20.	1-16

 Further documents are listed in the continuation of Box C. See parent family sheet.

Specific categories of cited documents:

- \*X\* documents defining the general state of the art which is not considered to be of particular relevance
- \*Y\* earlier application or patent published on or after the international filing date
- \*L\* documents which carry the same date or priority date(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*V\* documents referring to oral disclosure, use, exhibition or other means
- \*P\* documents published prior to the international filing date but later than the priority date claimed

The documents published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

Documents of particular relevance, the citation of which cannot be considered to establish the publication date or priority date, may be mentioned to give an inventive step when the document is cited alone

Document of particular relevance, the citation of which cannot be considered to give an inventive step when it is cited with one or more other such documents, such combination being obvious to a person skilled in the art

Document published on the same prior family

Date of the actual completion of the international search

21 June 2001 (21.06.2001)

Name and mailing address of the ISA/U.S.  
Commissioner of Patents and Trademarks  
Box PCT  
Washington, D.C. 20231  
Facsimile No. (703)305-3230

Date of mailing of the international search report

03 JUL 2001

Authorized officer  
ANDREW PAUL KELLY  
Telephone No. (703)305-3200

Form PCT/ISA/210 (second sheet) (July 1998)

Form PCT/ISA/210 (extra sheet) (July 1998)

**This Page is Inserted by IFW Indexing and Scanning  
Operations and is not part of the Official Record**

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- BLACK BORDERS**
- IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- FADED TEXT OR DRAWING**
- BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- SKEWED/SLANTED IMAGES**
- COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- GRAY SCALE DOCUMENTS**
- LINES OR MARKS ON ORIGINAL DOCUMENT**
- REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- OTHER:** \_\_\_\_\_

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.**